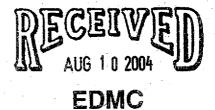
VALIDATION REPORT

SAF NUMBER F03-006

SDG NUMBER H2307

DRAFT

FINAL X



		COMMENT	RECORD (RC		1. Date 3. Project	200-PN-	2/4	2. Review N	e l of	2
5. Do	cument Number(s)/Title(s)		6. Program/Projec		7. Reviewer		a. Organiza	llon/Group	9. Location	n/Phone
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7	General Chemistry section: Oil and Grease analysis is indicated as method 9071A. This method is the extraction methodology used. Actual analytical methodology is EPA 413.1	•		Change analysis m for oil and greas BPA 413.1	ا سند س	102	Aces	y t I		The second se
3	Reduced size of form is and other attached data package documentation is difficult to read and will not allow for reproduction beyond the copy provided for review			Issued data validate reports will have original marked up and other supports data package documentation include at full size. This applies to all other validation reports provided by EQM.	the form prting luded Ls	102	Accep	o ted		

1. Date 2. Review No. 1/9/2004 **REVIEW COMMENT RECORD (RCR) (continued)** 3. Project No. 200-PW-2/4 4. Page 14. Reviewer Concurrence Required 15. Disposition (Provide justification if NOT accepted). 16. Status 12. Ilem 13a. Comment(s) 13b. Basis 13c. Recommendation Willaddress ches Comment on future validation reports. Various degrees of Ensure consistency of editorial style consistency are present throughout the report. between different Check and correct other validation report validation data packages sections. For example, for the same consistency rad chem section refers issues. to "Data Package Number" througout the report whoreas general chemistry section refers to "SDG" when referencing the data package.

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	ument Number(s) Tille(s) Package SDG H2307	6. Program/Project/Building Number Groundwater Protection program/200-PW-2 & 4.0		7. Reviewer Bill Thackabe	8. Organiz Env. &	ation/Group 9. Lo Science	allon/Phone E6-35 72-0742
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Date:

11/18/03

To:

Fluor Hanford

From:

EQM, Inc.

Project:

200 Area Source Characterization 200-PW-2 & 4 Operable Unit

Subject:

General Chemistry Analysis, Method -Data Package SDG H2307

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2307 prepared by Lionville Laboratory, Inc. (LLI) for General Chemistry analysis. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis & Method #
B173W0	7/31/03	Soil	C	CR ⁺⁶ 3060A/7196A,
				pH- 9045C,
				O&G 9071A/413.1,
			·	Solids-ASTMD2216-80
: '.				NO ₂ NO ₃ .EPA 353.2
				(mod)
B173W1	7/31/03	Soil	C	CR ⁺⁶ 3060A/7196A,
				pH- 9045C,
				G&O 9071A/413.1,
			· •	Solids-ASTMD2216-80
				NO ₂ NO ₃ -EPA 353.2
				(mod)
B173W2	8/04/03	Soil	C	CR ⁺⁶ 3060A/7196A,
			,	pH- 9045C,
				O&G 9071A/413.1,
				Solids-ASTMD2216-80
				NO ₂ NO ₃ EPA 353.2
				(mod)

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis BHI-01435 and Sampling and Analysis Plan, DOE/RL-2000-60, Rev. 1, Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualifiers

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain of Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by the Client- not applicable

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding time requirement are 30 days for chromium (VI), 28 days for oil and grease, and 24 hours for pH.

All holding times were met.

Method Blanks

At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water was processed through each set of the sample preparation and analysis procedures.

All method blanks fell within acceptable limits.

Field Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 75 to 125%. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no qualification is required.

Matrix spikes were analyzed where applicable (i.e. no matrix spike can be analyzed for pH) and met acceptance criteria

• Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)

LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 80-120%

All LCS/BSS met the acceptance criteria except the O&G which has a 76% recovery which is outside the laboratory limit of 80-120%. Based on the validation criteria all samples are nondetects and thus flagged UJ.

Precision

<u>Duplicate Samples</u>

Laboratory duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq 20\%$ for non-aqueous samples.

All duplicate results met these criteria.

Field Duplicate Samples

Sample B173W1 is a duplicate of sample B173W0. All sample-to-sample RPDs met acceptance criteria.

• Analytical Detection Limits

Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev 1.

All required detection limits were met except for the oil and grease which is measured as 667 mg/kg in the method blank and ranged from 685 to 692 mg/kg in the samples. All the reporting limits are above the SAP requirement of 200mg/kg. Samples are reported as non-detects. Per section 9.7 of the BHI validation procedure no flags were added.

Completeness

The data package for SDG H2307 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid.

The completeness percentage was 100%

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

See discussion of the LCS.

REFERENCES

BHI-01435. Rev 0, Validation Procedure for Chemical Analysis

DOE-RL2000-60, Rev. 1 (redline version 4/23/03), Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Plan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI-01435 and DOE/RL-2000-60.

U - Indicates the compound or analysis was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data was usable for decision making purposes.

J – Indicates the compound or analyte was analyzed and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data was usable for the decision making purposes.

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to identified major QC deficiency, the data are unusable.

UR – Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to a major QC deficiency.

NJ – Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e. usable for decision making purposes).

N – Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e. usable for decision making purposes).

Summary of Data Qualifiers

DATA QUALIFICATION SUMMARY

SDG: H2307	REVIEWER: MAH/MSM	DATE: 11/12/03, 11/22/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B173W0 B173W1 B173W2	UJ	Oil and Grease	LCS

Qualified Data Summary and Annotated Laboratory Reports

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Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD F03-006 H2307

LVL#: 0308L133

W.O.#: 11343-606-001-9999-00

Date Received: 08-08-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.

- The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
- 3. Sample holding times as required by the method and/or contract were met.
- 4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. The method blanks were within the method criteria.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits with the exception of 03LOG037-MB1 for Oil and Grease that was below the control limits of 80-120% at 76.2% (the associated matrix spike recovery for Oil and Grease was at 102.0%).
- 7. The matrix spike recoveries for Nitrate Nitrite, Oil and Grease and Chromium VI were within the 75-125% control limits.
- 8. The replicate analyses for Nitrate Nitrite, Oil and Grease, Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.
- 9. Results for solid samples are reported on a dry weight basis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

njpli08-133

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

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18 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

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Data Validation Supporting Documentation

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3.	BLANKS (Levels B, C, D, and E)	
ICB ar	nd CCB checks performed for all applicable analyses? (Levels D, E)	Yes No NA
ICB ar	nd CCB results acceptable? (Levels D, E)	Yes No N/A
Labon	atory blanks analyzed?	Yes No N/A
Labor	atory blank results acceptable?	(Yes) No N/A
ield l	blanks analyzed? (Levels C, D, E)	Yes No N/A
Field I	blank results acceptable? (Levels C, D, E)	Yes No (VA)
Transc	cription/calculation errors? (Levels D, E)	Yes No N/A
	nents:	
	그렇게 얼마나 생생하는 화를 살아가는 하는 사람이 되는데 하고 있다.	
1.	ACCURACY (Levels C, D, and E)	
Spike	samples analyzed?	Yes No N/A
	recoveries acceptable?	
	standards NIST traceable? (Levels D, E)	
Spike	standards expired? (Levels D, E)	Yes No (NA)
LCS/E	BSS samples analyzed?	Yes No NA
	BSS results acceptable?	
40.0	ards traceable? (Levels D, E)	-
	ards expired? (Levels D, E)	
Fransc	cription/calculation errors? (Levels D, E)	Yes No (N/A)
	rmance audit sample(s) analyzed?	
Perfor	rmance audit sample results acceptable?	Yes No AVA
Coma	nents: yes 50: Kes (MS) ACCEPTABLE.	
	TICK NOT ACCOTABLE for OGO.	
	Othe LCS OK.	

5.	PRECISION (Levels C, D, and E)				
Duplic	rate RPD values acceptable?	Marky bus drays were special to be easily as survived	****************	Reno NA	
	rate results acceptable?				
MS/M	SD standards NIST traceable? (Levels D, E)	******		Yes No (N/A	5
MS/M	SD standards expired? (Levels D, E)	#3.44.13558.4.4556.655.455.455.455.455.455.455.455.	e de	Yes No (N/A	3
Field (huplicate RPD values acceptable?	A-11		Yes No OXA	11600
Field s	plit RPD values acceptable?			Yes No MA	5 1/13/04
Transc	aription/calculation errors? (Levels D, E)			Yes No (N/A	5
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6.	HOLDING TIMES (all levels)				
Sampl	es propetly preserved?			Yes No N/A	
Sampl	e holding times acceptable?			MGS NO N/A	
Comm	이번화 취소는 사람들이 그렇게 하는데 되었다. 그는 그는 나는 그는 날이 하는데 먹는 그들은 것 같다.		A Company of the Comp		
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7.	RESULT QUANTITATION AND DETECTION LIMITS (all levels)	
Resul	lts reported for all requested analyses?	Yes) No N/A
Rrest	ults supported in the raw data? (Levels D, E)	Yes No (NA
Same	ples properly prepared? (Levels D, E)	Yes No (N/A
3 S S	ction limits meet RDL?	Yes (No) N/A
Trans	scription/calculation errors? (Levels D, E)	Yes No (N/A)
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Date:

November 14, 2003

To:

Fluor Hanford Inc.

From:

EOM

Project:

PW-2, 216-A-36B Borehole (C3248/C4160)

Subject:

Radiochemistry-Data Package No. H2307



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2307 prepared by Eberline Services. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B173W0	07/31/03	Soil	С	See note 1
B173W1	07/31/03			
B173W2	08/04/03			

¹⁻ Gamma Spectroscopy, alpha spectroscopy (U-iso, Pu-iso, Th-iso), Am-241, Np-237, Total-U, Tc-99, Sr-89, 90 (Total), C-14, I-129, Ni-63, H-3.

Data validation was conducted in accordance with BHI validation procedure, *Data Validation Procedure for Radiochemical Analysis*, October 2000, BHI-01433, Rev. 0 and the *Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, DOE/RL-2000-60, Rev. 1. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Data Requested by Client- not applicable

DATA QUALITY PARAMETERS

Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

• Preparation (Method) Blanks

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; samples results above the MDA and greater than five times the highest blank concentration are not qualified.

For Eu-154, the blank results were reported as "U", but the reported MDA was greater than the RDL. In those cases, the MDA's were used in the data evaluation criteria for the blanks. Based on the evaluation, "J" qualifiers were applied for Eu-154.

Field Blank

No field blanks were submitted for analysis.

Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 65-135%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All LCS accuracy results were acceptable.

Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

Laboratory Duplicates

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If a duplicate sample was not analyzed, qualify all associated sample results as estimated (J, UJ). If the sample and duplicate concentration are both >5xRDL and the RPD is >20% for water samples (>35% for soil samples), qualify all associated sample and duplicate results as estimated (J). If both sample and duplicate results are non-detect, no qualification is required. If either or both of the sample and duplicate sample concentrations are <5xRDL, the above RPD criteria do not apply and the range of the sample and duplicate concentrations must be evaluated as follows:

- If the range in concentration between the sample result(s) or quantitation limit(s) are ≤RDL unit for water samples (≤2xRDL units for soil samples), no qualification is required.
- If the range in concentration between the sample result of quantitation limit are >RDL unit for water samples (>2xRDL units for soil samples), then qualify all associated sample results as estimated (J). Non-detects are not qualified.

All duplicate results were acceptable.

Field Duplicate

Samples B173W0 and B173W1 were field duplicates. The RPD's are calculated when both the sample results and the duplicate results are greater than 5X the analyte specific RDL. All calculated RPD's were acceptable. In addition, if either the sample or duplicate is less than 5X the analyte specific RDL, the range of the sample and duplicate concentrations must be evaluated. The ranges for Ra-226 and Ra-228 exceeded the criteria of 2X the RDL.

As per the data validation procedure, data qualifiers are not required for field duplicate RPD's. The information is provided to alert data users to uncertainties in the data set during decision making.

Detection Levels

The reported MDA's exceeded the RDL's for Co-60, Ra-226, Ra-228, Eu-152, Eu-154 and Eu-155 for all of the samples. The reported MDA exceeded the RDL Cs-137 for sample B173W0. As per the data validation procedure, no qualifiers are required to be applied to the data.

Completeness

Data package No.H2307 was submitted for validation and verified for completeness. Completeness is based on the percentage of date determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

- Due to blank results exceeding the data validation criteria, "J" qualifiers were applied to Eu-154, for all samples.
- Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

REFERENCES

Data Validation Procedure for Radiochemical Analysis, October 2000, BHI-01433, Rev. 0

Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan, DOE/RL-2000-60, Rev. 1.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimated, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the date are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2307	REVIEWER: KAB	DATE: 11/14/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B173W0	J	Eu-154 C-14	Blank No matrix spike
B173W1	J J	Eu-154 C-14	Blank No matrix spike
B173W2	J J	Eu-154 C-14	Blank No matrix spike

Qualified Data Summary and Annotated Laboratory Reports

BBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H2307

7562-001

DATA SHEET

B173W0

	7562 Melissa C. Mannion	Client/Case no Contract		SDG_H2307
Lab sample id Dept sample id	R308042-01	Client sample id		PAT TO
Received			07/31/03 07:30 264.	

ANALYTE	CAS NO	RESULT pci/g	20 BRR (COUNT)	MDA pCi/g	bci/a	QVALI- FIBRS	TEST
Tritium	10028-17-8	10.0	0.36	0.24	400		H
Carbon 14	14762-75-5	0.108	1.6	2.7	50	τσ	C
Nickel 63	13981-37-8	-0.786	1.3	2.2	30	U	NI_L
Total Strontium	SR-RAD	102	2.2	0.38	1.0		SR
Technetium 99	14133-76-7	-0.042	0.23	0.56	15	Ü	TC
Thorium 228	14274-82-9	0.579	0.26	0.25	4 - 1		TH
Thorium 230	14269-63-7	0.418	0.26	0.25	1.0		TH
Thorium 232	TH-232	0.418	0.26	0.25	1.0		TH
Total Uranium (ug/g)	7440-61-1	2.52	0.29	0.007	1.0		u_T
Uranium 233/234	U-233/234	3.87	0.76	0.20	1.0		U
Uranium 235	15117-96-1	0.096	0.13	0.25	1.0	U	U
Uranium 238	U-238	1.56	0.46	0.20	1.0		σ
Neptunium 237	13994-20-2	0.042	0.085	0.13	1.0	U	NP
Plutonium 238	13981-16-3	0.035	0.11	0.19	1.0	U	PU
Plutonium 239/240	PII-239/240	0.368	0.18	0.13	1.0		PU
Americium 241	14596-10-2	0.194	0.15	0.19	1.0		AM
Iodina 129	15046-84-1	-0.080	0.42	0.95	2.0	U	I
Potassium 40	13966-00-2	19.4	1.8	1.0			GAM
Cobalt 60	10198-40-0	0.280	0.11	0.11	0.050		GAM
Tin 126	15032-50 5	U		0.20		u	GAM
Cesium 134	13967-70-9	ប		0.11		T)	GAM
Cesium 137	10045-97-3	2.56	0.17	0.13	0.10		GAM
Radium 226	13982-63-3	0.743	0.19	0.18	•		GAM
Radium 228	15262-20-1	1.15	0.49	0.44	4		GAM
Europium 152	14683-23-9	U	-	0.23	0.10	บ	GAM
Europium 154	15585-10-1	U		0.30	0.10	U-3	GAM
Europium 155	14391-16-3	U		0.27	0.10	U	GAM
Thorium 228	14274-82-9	0.796	0.098	0.10			GAM

200-PW-2/200-PW-4 CU-Borehole Soil

KB 1114103

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Protocol Hanford
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Version 3.06
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EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP B2307

7562-001

DATA SHEET, cont

B173W0

.	7562 Melissa C. Mannion	Client/Case no Contract		SDG_H2307
Lab sample id Dept sample id Received † solids	7562-001 08/08/03		216-A-36B (C4160) 07/31/03 07:30 264	

akalyte	CAS NO	RESULT pci/g	2s ERR (COUNT)	MDA pci/g	RDL pCi/g	QUALI- FIRES	TRET
Thorium 232	TH-232	1.15	0.49	0.44			GAM
Uranium 235	15117-96-1	U		0.50		U	GAM
Uranium 238	0-238	U		12		יט ••••	GAM
Americium 241	14596-10-2	U	• :	Q.33		U	GAM

200-PN-2/200-PW-4 OU-Borehole Soil

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Protocol Hanford
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Version 3.05
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EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H2307

7562-002

DATA SHRET

B173W1

	7562 Melissa C. Mannion	Client/Case no Contract		SDG_H2307
•	7562-002	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-36B (C4160) 07/31/03 07:30 260.	

AWALYTE	CAS NO	PCI/g	25 ERR (COUNT)	MDA pci/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	12.4	0,40	0.25	400		н
Carbon 14	14762-75-5	0.247	1.7	2.8	50	υŢ	C
Nickel 63	13981-37-8	<u>-1.68</u>	1.4	2.4	30	ซ	NI L
Total Strontium	SR-RAD	87.4	2.0	0.37	1.0		SR
Technetium 99	14133-76-7	0.089	0.27	0.57	15	Ū	TC
Thorium 228	14274-82-9	0.293	0.20	0.25			TH
Thorium 230	14269-63-7	0.520	0.25	0.25	1.0		TH
Thorium 232	TH-232	0.813	0.33	0.25	1.0		TH
Total Tranium (ug/g)	7440-61-1	1.49	0.17	0.007	1.0		U_T
Uranium 233/234	U-233/234	2.31	0.54	0.21	1.0		U .
Uranium 235	15117-96-1	0.097	0.13	0.25	1.0	U	U
Uranium 238	U-238	1.02	0.34	0.21	1.0		U
Neptunium 237	13994-20-2	O	0.092	0.14	1.0	ט	NP
Pluconium 238	13981-16-3	0.052	0.052	0.20	1.0	IJ	PU
Plutonium 239/240	PU-239/240	0.414	0.21	0.20	1.0		PU
Americium 241	14596-10-2	0.051	0.10	0.20	1.0	U ·	AM
Iodine 129	15046-84-1	-0.051	0.36	0.82	2.0	U	I .
Potassium 40	13966-00-2	16.1	6.2	0.89			GAM
Cobalt 60	10198-40-0	0.246	0.10	0.10	0.050		GAM
Tin 126	15832-50-5	Ū	*.	0.11		ប	GAM
Cesium 134	13967-70-9	ប		0.10	• •	Ų ·	GAM
Cosium 137	10045-97-3	2.55	0.12	0.090	0.10		GAM
Radium 226	13982-63-3	0.456	0.24	0.16	1		GAM
Radium 228	15262-20-1	0.544	0.44	0.32	•		GAM
Europium 152	14683-23-9	U .		0.19	0.10	Ū	GAM
Europium 154	15585-10-1	U		0.26	0.10	v 3	GAM
Europium 155	14391-16-3	ū		0.17	0.20	U	GAM
Thorium 228	14274-82-9	0.753	0.19	0.14			GAM

200-PW-2/200-PW-4 QU-Borehole Soil

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EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP 12307

7562-002

DATA SHEET, cont

B173W1

1	7562 Melissa C. Mannion	Client/Case no Contract		SDG_H2307
	7562-002	Collected/Weight	B173W1 216-A-36B (C4160) 07/31/03 07:30 260.3 F03-006-201 P03-6	SOLID 2 g

ANALITE	CAS NO	PC1/g	20 EER (COUNT)	MDA pci/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	TH-232	0.544	0.44	0.32			GAM
Uranium 235	15117-96-1	ប		0.27		U	GAM
Uranium 238	U-238	U		9,6		U	GAM
Americium 241	14596-10-2	U		0.11		U	CAM

200-FW-2/200-FW-4 OU-Borehole Soil

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Report date 09/19/03

BBERLINE SERVICES/RICHMOND BANGLE PELIVERY CROSS H2307

7562-003

DATA SHEET

B173W2

SDG 7562	Client/Case no	Hanford SDG H2307
Contact Melisea C. Manniton	Contract	No. 539
Lab mample id R308042-03	Client sample id	
Dept sample id 7562-003		215-A-36B [C4160]
Received DB/OR/03		05/04/03 11:25 290.E d
f solida <u>97.2</u>	Cuptody/SAP Wa	F03-006-201 P03-006
* 5011da <u>87. 2</u>	Cualody/SAP Wa	F03-006-201 P03-006

ATALITE	Cas No	RESULT pC1/g	2s HPR (COUNT)	MDA pCi/g	SOT SOT	QUALI- FIEFS	TG#2
Tratium	10028-17-8	21.0	g.5)	0.27	4D0		ĸ
Carbon 14	14763-75-5	0.104	1.6	2.8	50	υŢ	C,
Wickel 63	13981-37-8	-2.05	1.3	Z.4	30	Ū	NL L
Total Strontium	SR-RAD	-0.085	0.14	0.32	1.0	O C	SR
Technotium 59	14133-76-7	0.210	0.17	0.52	15	Ü 👙	TC
Thorium 229	14274-02-9	0.922	0.34	0.25			TH.
Thorium 230	14269×63-7	0.362	Ď.26	0.25	1.0	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	71
Thorium 232	TH-232	0.953	0.34	0.25	1.0	4.7	TH
Total Uranium (ug/g)	7440-61-1	0.505	0.060	0.007	1.0		U_T
Oranium 233/234	U-239/234	0.845	0.30	0.22	I.D		IJ
Oranium 235	15117-96-1	0.034	0.068	0.26	1.D	Ţ,	ប_
Uranium 238	U-238	0.705	0.39	0.22	1.0	4 . 3,7 .	U
Naptunium 237	13994-20-2	Ō	0.077	0.12	1.0	Ţ3	MP
Pluconium 238	13981-16-3	-D.827	Ø.054	0.21	1.0	ប	₽U
Plutonium 239/240	FU-239/240	0.027	a 054	0.21	1.0	Ų	₽U`
Americium 241	14596-10-2	D .	0.040	0.15	1.0	IJ	AM
Iodina 179	15046-94-1	6.069	0.39	0.98	2.0	G G	I , (
Potezalum 40	13966-00-2	18.2	1.4	Ö,7Z			GAM
Cobalt 60	10198-40-9	U	* * * * * * * * * * * * * * * * * * * *	0.088	0.050	U	Gale
Tin 126	15012 50 5	U		0.80	1	ער	GPM
Cepium 134	1,1967-70-9	U		D.093		บ	GAH
Cesium 137	10043-97-3	0.132	0.036	0.074	0.30	· ·	CP34
Radium 226	13902-63-3	0.636	0.15	O.15	:	*	GJJ4
Redium 238	15767-70-1	1.13	0.33	p.16			GAM
Europium 152	14683-23-9	U		0.16	0.10	u	CAM
Europium 154	15505-10-1	Ŭ ×		D.25	0.10	v 3	Gum
Europium 155	14391-16-3	IJ	* * * * * * * * * * * * * * * * * * * *	0.16	0.10	U	GAM
Thorium 228	14274-82-9	EQQ.Q	6.083	0.076		* - * 9	CAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Form DVD-DS
Version 1.05
Report date 09/19/0)

EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H2307

7562-003

DATA SHEET, cont

B173W2

1	7562 Melissa C. Mannion	Client/Case no Contract		SDG_H2307
Lab sample id Dept sample id Received % solids	7562-003 08/08/03		216-A-36B (C4160) 08/04/03 11:25 290.	

ANALYTE	CAS NO	PCI/g	20 ERR (COUNT)	MDA pci/g	RDL pci/g	QUALI- FIRRS	TEST
Thorium 232	TH-232	1.13	0.35	0.36			GAM
Uranium 235	15117-96-1	บ		0.23		U	GAM
Uranium 238	U-238	υ		10		Ū	GAM
Americium 241	14596-10-2	U		0.18	÷ .,	U ·	GAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/19/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2307 was composed of three solid (soil) samples designated under SAF No. F03-006 with a Project Designation of: 200-PW-2/200-PW-4 OU – Borehole Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.6 Iodine-129 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.8 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

2.9 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.10 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.11 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.11 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.12 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion
Program Manager

Date

POE24 : 4230"

	en en men en e	Addition in departure majorosasjoo oo saada da dii saasaa ja joha oo saasaa da d						,		-			-	
	FII-Central Plateau Project	au Project	CB	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	TODY/S/	MPLE	ANALY	SIS RE	OUEST	_	F03	F03-006-201	1 480	* **
-	Collector Pope/Pfister/Hughes/Johnnsen	Ų	Compar LCH	Company Contact LC Hulstrom	Telephone No. 373-3928	-	12307	Pro	Project Coordinator TRENT, SJ		Price Code	N8	Data Tu	Data Turnaround
	Project Designation 200-PW-2200-PW-4 OU - Borehole Soil Sampling	Sorefiole Soil Sampling	Samplir 216-7	Sampling Location (1977) 216-A-36B (C3248)-53.5	1.1.03 (0.4	(04140)	(7562	SAF No.	No. 006	*	Air Quality		t	45 Days
	Ice Chest No.	30.10	Frich L.	Field Logbook No. HNF-N-3361		COA 117504ES10	0	Med	Method of Shipment Federal Express	t t				
	Shipped To EBERT INE SHRVICES (Formerly TMA)	merly TMA)	Offsite	Offsite Property No.	A020	324	Ď.	iig	Bill of Lading/Air Bill No.	Bill No.	N	<i>[1</i>]	0000	
•	POSSIBLE SAMPLE HAZARDSREMARKS RADIOACTIVE TIE TO: B173V3, B173V4, B17495	IRDS/REMARKS 173, B17374, B17495		Preservation		No.	X20X	None						
	4			Type of Container) D#	9G	OB O	Og.						
	Special manding and/or Storage	Storage	1	No. of Container(s)	=-	1	_	1						
	· V D Marin			Volume	SOMIL.	. 60ml.	Man Com L	60mL				-		
	August August and the Control of the			Andrews and Andrew	NO2NO3- 153 ; Oli & Great - 413 ;;	See item (I) in Special Instructions.	See ten (2) in Special Instructions.	Milliam - 193						
		Sample analysis			100 Comments of the Comments o		•							
19	Sample No.	Matrix *	Sample Date	Sample Time										
٠	B173W0	SOIL	7.31.03	0730		×	/	7						
	B173W1	SOIL	7.3.03	0730		¥	17	7						
•	A THE RESERVE OF THE PARTY OF T	may (for an) was a supression was a supression of the supression o	a series es plumes plumes, desta de ablancam incoloración activa de la coloración de la col	инфункцияцияция на выправний примененто выпользаний примененто выпользаний примененто выпользаний примененто в										
٠				AT THE REAL PROPERTY OF THE PR										
	CHAIN OF POSSESSION	N.	Sign/Print Names	Vames		SPECE	SPECIAL INSTRUCTIONS	CITIONS						Matrix *
	Relinquished By/Renoved From	Date/fine	Received By/Stored In	7/31/3	Date/Time /036	The last	is to achieve a days) may not	detection limites the the	The lab is to achieve a detection limit of $50.0 \mathrm{pCMg}$ for C-14. FH ackton 14 days) may not be met by the lab due to the radi characteristics.	C-14. FF	I acknowledge stics.	FH acknowledges that holding times (less toristics.	ines (less	S=Soil 68=Sediment
		l . ∼	Received By/Sto	Chen Kit	Date/Time	8	nna Spectrosc Spec - Add-or	opy (Cesium-134,	 Ganuna Specifoscopy (Cesiun-137, Cobalt-69, Europium-152, Europium-154, Furopium-155); Ganuna Spec - Authon (Cesium-134, Radium-226, Radium-228, Tir-126); Total Branium, Americium- 	ropium-15 dium-228,	2, Europlum-1 Tin-126); Fot	54, Europium-l il Uranium, Am	155); teriofun-	SOwSolid SiwShdge W= Water
	John By Rengred Rom	3 6	Received DyrStored III	S MADH .		T	241; Isotopic Flutonium; Isotopic Uranium (2) Technetium-99; Strontium-89,90 — To 129; Nickel-63; Nephnium-237	n; Isotopio Ura roatium-89,90 nium-237	241; Isotopic Plutonium; Isotopic Uranium (2) Tecknetium-99; Stroatium-89;90 — Total Sr. Isotopic Thorium (Thorium-232); Carben-14; Iodimo- 129: Nickel-63; Nortunium-237	ne Thenium	s (Therium-23	2]; Carbon-14;	Iodino-	O-Oil A-Air DS-Drum Solide DI-Airem Haulie
	Refinguished By Renoved From	Stole	\$	Pro brothurs	KING 2 OSU		•							P-Tisase W/Wipe LLiquid
	- 32	Ogno Soll Mary Son		EN 817103 B	SE SE									V-Vegetation X-Caber
	Retroubled By Removed From	Datk/Time	Received By Stoned In	88	55 (RC)					i +				
	LABORATORY Received By SECTION				Title							Dat	Date/Time	
	FINAL SAMPLE Disposal Method DISPOSITION	stbod		and the state of t			Disposed By	Jan.				IZQ	Date/Time	
	BHI-EE-011 (03/01/2002)								-				***************************************	

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Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	©	D		
PROJECT: 216	,-A-36B B	orehole-PW-2	DATA PACKAG	E: H2307		
	. Browner			DATE:		
CASE:			SDG: H230	יי		
		ANALYSES I	PERFORMED			
Gross Alpha/Deta	some states	(Technothers 49)	Alpha Spectroscopy	General Spectroscopy		
(Total Unition)	Padius-72	(Tarian)	C-14	Ni-63	HA	
SAMPLES/MAT	RIX B 1734	10, B173W	1, B173W2			
	Soil					
					. ,	····
					··············	
1. Completenes	S	· > ~ ~ ~ * * * * * * * * * * * * * * * *	· 表面长加克森森(1) 在前部中部原因 (1) 在出的现在分词	\$6 06 5888 68385563855555555	4	. 🗆 N/A
Technical verific	cation forms pre	sent?,	. 82784722223333333242444444	**********	Yes	No(N/
Comments:						
			A CONTRACTOR OF THE CONTRACTOR	· · · · · · · · · · · · · · · · · · ·		
	*	**************************************		<u> </u>		
				. · · · · · · · · · · · · · · · · · · ·		·
				<u></u>		
2. Initial Calibr	ation (Levels D,	E)	**************************************	******************	** *********	N/A

Initial calibratio	n acceptable?	*****************	** ***************	Khassatetanamanagatetanapa	Yes	No N/A

Data Validation Pr	ocedure for Radioc	hemical Analysis				A-1

Appendix A - Radiochemical Data Validation Checklist

Standards Expired?	Yes	No	N/A
Calculation check acceptable?			
Comments:			
			
			
			_
3. Continuing Calibration (Levels D, E)	*********	<u></u>	N/A
Calibration checked within required frequency?	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	NA
Calculation check acceptable?	Yes	No	N/A
Comments:			
		(
	TWO DESCRIPTION OF THE PARTY OF		
	·····		

4. Background Counts (Levels D, E)	*********	X	N/A
Background Counts checked within required frequency?	Yes	No	N/A
Background Counts acceptable?	Yes	No	N/A
Calculation check acceptable?			
Comments:			

	handgai andreas (th. merce arre a.e. a.e. 7		

5. Blanks (Levels B, C, D, E)	□ N/A
Method blank analyzed within required frequency?	(Yes) No N/A
Analytes detected in method blank? 10-15-1	(Yes) No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes (No)N/A
Analytes detected in field blank(s)?	
Transcription/Calculation Errors? (Levels D, E)	Yes No NA
Comments: CU-154 blanks results reported as "U	"the MOA
Transcription/Calculation Errors? (Levels D. E). Comments: Cu-154 blanks results reported as "U of Oallpala exceeded the ROL of O.10 pala. F w-154 regults "5".	Fag all
6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	🗆 N/A.
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	(Yes) No N/A
LCS/BSS traceable? (Levels D,E)	Yes No (NA)
LCS/BSS expired? (Levels D,E)	Yes No (N/A)
LCS/BSS levels correct? (Levels D,E)	Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E)	Yes No (VA)
Comments: No qualitions	
h	
*	
7. Chemical Carrier Recovery (Levels C, D, F)	🗆 N/A
Chemical carrier added?	(Yes No N/A
Chemical recovery acceptable?	
Chemical carrier traceable? (Levels D, E)	
Data Validation Procedure for Radiochemical Analysis	
October 2000	A-3

Chemical carrier expired? (Levels D, E)	
Transcription/Calculation errors? (Levels D, E)	Yes No NA
Comments:	No
8. Tracer Recovery (Levels C, D, E)	N/A
Tracer added? Tracer recovery acceptable? ,	Yes)No N/A
Tracer recovery acceptable?	YES)NO N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)
Comments:	
No tracord carnier used for C-16 to be 1000	1, yeld assume
J C-14 results	
9. Matrix Spikes (Levels C, D, E)	□ N/A
Matrix spike analyzed?	Yes No N/A
Spike recoveries acceptable?	
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? Levels D, E)	Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) Comments: MS ONW DERASONE & FOR H-3	Yes No (N/A)
Comments: M5 only performed for H-3	conalysis

October 2000

10. Duplicates (Levels C, D, E)	🗆 N/A
Duplicates Analyzed at required frequency?	(Yes) No N/A
RPD Values Acceptable?	(Yes) No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No(NA)
Comments: No qualitions	
**	,
11. Field QC Samples (Levels C, D E)	
Field duplicate sample(s) analyzed?	(Yes) No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split sample(s) analyzed?	Yes No N/A)
Field split RPD values acceptable?	Total Control of the
Performance audit sample(s) analyzed?	Yes No (NA)
Performance audit sample results acceptable?	Yes No (VA)
comments: 5 cmples B173W1 and B173WO ary	duplicates
	ell
The range for the Ra 226 and Ra 228 result	3 WESTL
greate than 2x the RDL's. No gualifier	5
	or o
12. Holding Times (All levels)	
Are sample holding times acceptable?	Yes No N/A
Comments:	

		entralization de la constantina de la c	AMARIA II - Markagi Mada II Alian Andrea - January Mada II andrea - January Mada II andrea - January Mada II a
	And the state of t		
	Ç	ADM.	
5170Y 7	am ton 5.	ट्यादीत् र इ/ र	Comments: Studing
AWON 80Y		ors? (Levels D, E).	Transcription/calculation err
AN West	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	?stimil noi	MDA's meet required detecti
MNON BOX	**********************	rozs? (Levels D, E)	na noiseluola Dvoitqinana cn
AND ON 22Y	wx ************************************		stantis Acceptuble? (Levels
₹N) 0N 89X	p\$#\$\$\$ 4张\$ 00 6 6 4 4 \$\$ \$ 4 5 5 5 5 6 5 5 5 6 6 5 7 4 8 8		tab wer ni bəhoqqua altıras?
A/N ON (S)	r		esults and Detection La ts reported for all requi

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